REMARKS

In this reply, Applicant has amended claims 1 and 7, canceled claims 10 and 11, and added new claims 16 and 17. Accordingly, claims 1-9 and 12-17 are pending, with claims 1 and 17 in independent form.

Claim 7 has been amended for clarity and to correct its dependency. No new matter has been added via this amendment.

Claims 1, 2, 4-8, and 10-15 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Applicant's admitted prior art (DE 195 06 093 02, "APA") in view of Spaeth (U.S. Patent No. 5,812,570, "Spaeth"). In this reply, claim 1 has been amended to include certain limitations of previously pending claim 11. As amended, claim 1 covers semiconductor devices that include, in part, "a beam-collimating device, wherein the laser diode bar and the beam-collimating device are disposed on a common surface of the cooling element." Neither APA nor Spaeth, alone or in combination, discloses or suggests such semiconductor devices.

With regard to previously pending claim 11, the Examiner acknowledges that APA "does not illustrate the lens on one and the same surface as the semiconductor component" (Action at page 3). However, the Examiner alleges that "in accordance with MPEP 2144.04 VI C ... rearrangement of the collimating lens is considered an obvious design choice because the collimating [lens] regardless of its position would provide the same function of collimating the beam, thereby the positioning of the lens does not modify the operation of the claimed invention" (Action at pages 3-4).

Applicant disagrees with the Examiner's argument regarding the position of the collimating lens, for at least the following reasons. APA generally discloses that lens 62 is used to collimate the output of laser bar 12, which is typically highly divergent. To achieve collimation, APA specifically discloses that laser bar 12 should be positioned at an edge of cooler 20 to maintain a short distance between laser bar 12 and lens 62 (see Figure 2 in Applicant's specification). As a result, a cross-sectional area 54 of cooler 20 allows heat flow between laser bar 12 and cooling channels within cooler 20.

Applicant has recognized that improved cooling efficiency can be achieved by positioning laser bar 12 *away from* the edge of cooler 20, as shown in Figure 1 of Applicant's specification, thereby increasing the cross-sectional area 34 of cooler 20 through which heat flows from laser bar 12 to the cooling channels within cooler 20. The specification states that "[p]referably, as illustrated in Fig. 1, the length of microstructured region 32 is greater than that of power laser diode bar 12, thereby enlarging the cross section of the region in which the flow of heat from power laser diode bar 12 to microstructured region 32 takes place" (Applicant's specification, page 6, lines 13-15). Because enlarging the cross section of the region of heat flow generally leads to improved cooling of laser bars, Applicant's semiconductor devices are typically more efficient than devices disclosed by APA, for example.

By positioning laser bar 12 some distance away from the edge of cooler 20, Applicant has also recognized that the position of lens 40 may need to be changed. In particular, Applicant has recognized that to maintain lens 40 and laser bar 12 proximal to one another for proper collimation of the output of laser bar 12, lens 40 and laser bar 12 can be positioned on a common surface of cooler 20. This has the added advantage of eliminating APA's external lens support 60, reducing the complexity of Applicant's semiconductor device relative to APA's device. The specification states that "no corresponding extra attaching part is needed with the device" (Applicant's specification, page 5, line 10).

In summary, significant advantages are obtained by positioning laser diode bar 12 away from an edge of cooler 20, and by positioning lens 40 and laser bar 12 on a common surface of cooler 20. These advantages are not recognized by APA or Spaeth – there is no disclosure or suggestion in either of these references that would have provided a reason for a person of skill in the art to modify the devices of APA and/or Spaeth to cover the semiconductor devices of claim 1. To the contrary, APA specifically discloses that laser bar 12 should be positioned at an edge of cooler 20 to maintain proximity to lens 62.

In the absence of any reason to modify the devices of APA and/or Spaeth, and in view of APA's teaching that laser bar 12 should be positioned at an edge of cooler 20, Applicant's claimed semiconductor devices do not result merely from an obvious design choice, as alleged

by the Examiner. Applicant's claimed devices, as a result of the positions of both laser bar 12 and lens 40 is not the same as prior art devices. By positioning laser bar 12 and lens 40 on a common surface of cooler 20, Applicant has realized numerous advantages that are neither disclosed nor suggested by any of the prior art references of record.

Accordingly, Applicant submits that amended claim 1 is patentable over both APA and Spaeth, alone or in combination, and requests reconsideration and withdrawal of the rejection of claim 1 under 35 U.S.C. § 103(a).

Claims 2, 4-8, and 12-15 depend from claim 1, and are therefore patentable for at least the same reasons. Accordingly, Applicant requests reconsideration and withdrawal of the rejections of these claims as well.

Claims 3 and 9 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over APA in view of Spaeth, Hall (U.S. Patent No. 4,525,178, "Hall"), and Razeghi et al. (U.S. Patent No. 5,012,476, "Razeghi"). Applicants note that claims 3 and 9 both depend from amended claim 1, which is patentable over both APA and Spaeth, as discussed above.

Neither Hall nor Razeghi cures the deficiencies of APA and Spaeth with regard to claim 1, at least because neither Hall nor Razeghi provides a reason for a person of skill in the art to modify APA's devices to cover the devices of claim 1. Accordingly, claim 1 is patentable over each of APA, Spaeth, Hall, and Razeghi, alone or in combination. Moreover, claims 3 and 9 are patentable over each of APA, Spaeth, Hall, and Razeghi for at least the same reasons as claim 1.

Applicant also wishes to address the Examiner's comments with respect to claim 9. Claim 9 covers semiconductor devices that include an intermediate support that comprises a diamond composite material. The Examiner admits that neither APA nor Spaeth discloses such supports, but states that Hall discloses a diamond composite material, and alleges that "it would have been obvious ... to combine the diamond composite material of Hall with the APA of figure 2, because it will provide impact resistance due to its high modulus of elasticity" (Action at page 4).

Applicant disagrees with the Examiner's arguments for at least the following reasons. First, the Examiner alleges that improving impact resistance would provide motivation to include

diamond composite materials in an intermediate support layer of a laser device. However, there is no disclosure in either Applicant's specification or in any prior art of record that relates to semiconductor devices undergoing impact. There is simply no evidence to suggest that a person of skill in the art would modify prior art devices to increase impact resistance, as laser devices of the type disclosed in both Applicant's specification and in the prior art of record are not designed for use in applications where impacts are sustained.

Second, it is not all clear that, based on Spaeth's disclosure, the diamond composite materials disclosed by Hall would be suitable for use in Spaeth's intermediate support. Specifically, Spaeth discloses that his support material "must have good electrical and thermal conductivity" (Spaeth, col. 4, line 46). Hall does not disclose whether his diamond composite materials have both good electrical and good thermal conductivity. However, diamond generally has good thermal conductivity but relatively poor electrical conductivity. Therefore, in the absence of any positive disclosure by Hall of a diamond composite material with both good electrical and good thermal conductivity, it cannot be fairly stated that it would have been obvious to use Hall's diamond composite materials in Spaeth's intermediate support. To the contrary, there is a substantial question as to whether Hall's materials would be suitable for this purpose.

Accordingly, for all of the foregoing reasons, Applicant submits that claims 3 and 9 are patentable over each of APA, Spaeth, Hall, and Razeghi, alone or in combination. Reconsideration and withdrawal of the rejections of claims 3 and 9 is respectfully requested.

New claim 16 has been added. Claim 16 recites semiconductor components where the beam-collimating device includes a microlens. Claim 16 includes certain limitations of previously pending claim 11 and therefore introduces no new matter.

Claim 16 depends from claim 1 and is therefore patentable for at least the same reasons discussed above. Accordingly, Applicant requests allowance of claim 16.

New independent claim 17 has been added. Claim 17 covers semiconductor devices that include, in part, "an intermediate support disposed between the semiconductor component and the cooling element ... [and] formed of a diamond/metal matrix material that comprises at least

one metal selected from the group consisting of copper, cobalt, and aluminum." Claim 17 includes certain limitations from previous claims 1 and 9, and therefore introduces no new matter.

As discussed above in connection with claim 9, none of APA, Spaeth, Hall, and Razeghi discloses or suggests the semiconductor devices covered by claim 17, at least because Hall's disclosure would not have provided any reason for a person of skill in the art to modify Spaeth's intermediate support to include a diamond composite material. Accordingly, allowance of claim 17 is respectfully requested.

In view of the foregoing, Applicant asks that the application be allowed.

Canceled claims, if any, have been canceled without prejudice or disclaimer. Any circumstance in which Applicant has: (a) addressed certain comments of the Examiner does not mean that Applicant concedes other comments of the Examiner; (b) made arguments for the patentability of some claims does not mean that there are not other good reasons for patentability of those claims and other claims; or (c) amended or canceled a claim does not mean that Applicant concedes any of the Examiner's positions with respect to that claim or other claims.

The fees in the amount of $460 for the Petition for Extension of Time fee is being paid concurrently on the Electronic Filing System (EFS) by way of Deposit Account authorization. Please apply any other charges or credits to deposit account 06-1050, referencing Attorney Docket No. 12406-109US1.

Respectfully submitted,

Date: 11/26/07

Marc M. Wefers
Reg. No. 56,842

Fish & Richardson P.C.
225 Franklin Street
Boston, MA 02110
Telephone: (617) 542-5070
Facsimile: (617) 542-8906

21790813.doc